Book Reviews

Krüssmann, G.: Die Nadelgehölze. Eine Nadelholzkunde für die Praxis.
Berlin: P. Parey 1979. 264 pp., 328 figs., 8 tabs. Hard bound DM 98,–
The third edition of this well prepared book with an excellent format comes out nearly 19 years after the second edition. After a terminological introduction and a systematic glance (with short descriptions) at the mentioned gymnospermous genera and higher systematic categories follows descriptions of 1244 species respective forms. Compared with the second edition (1960) it means a reduction of more than 250 species from chiefly subtropical and tropical conifers. But it must be emphasized that 182 forms are described for the first time in this new work of Krüssmann which are not treated in the 'Handbuch der Nadelgehölze' (1970-1972) of the same author. Apart from the introductary parts the work is printed in double columns with many new photos. In genera with numerous cultivars a special view of their fancy-names is given in alphabetical order. This new book is very valuable for both friends of gardening and dendrobiologists. W. Vent, Berlin

Farnsworth, M.W.: Genetics.
New York-Hagerstown-San Francisco-London: Harper & Row 1978. 626 pp., 298 figs., 26 tabs. Hard bound $ 18,95
This book was written for a one-semester course in genetics for students in biological sciences. In the first section (234 pp.) the important areas of classical genetics are explained: Mendel's laws, gene expression, chromosomes, mitosis, meiosis, linkage, crossing over, mapping, ploidy, and changes in the structure of chromosomes. The next two chapters deal with such fundamentals of the molecular basis of genetics as gene-enzyme relations, DNA structure and replication. This is followed by one chapter on the genetics of bacteriophages and one on the genetics of bacteria. Only after the gene has been defined in yet another chapter are the molecular mechanisms of gene expression, mutation and regulation introduced. The final chapters discuss cytoplasmic inheritance, population genetics and evolution.

This textbook comprises all fundamental facts and is intelligibly written. Studying is further facilitated by apt graphic charts. Problems at the end of each chapter enable students to improve their knowledge. The author gives a balanced survey of the whole of genetics, and in most cases the latest results are included. The textbook will ably further the understanding of the historical development of genetics. It is a pleasure to read the textbook but I am inclined to believe that in its present form it will be much too time-consuming for students to learn genetics by repeating so much historical detail. E. Günther, Greifswald

Schütte, R.; D. Gross (eds.): Regulation of developmental processes in plants.
Jena: VEB Fischer 1978. 408 pp., many figs., 20 plates. Paperback DM 38,–
The papers from 23 invited speakers of the International Conference on Regulation of Developmental Processes in Plants, held in 1977 at Halle (GDR), nearly exclusively revolve around the control of differentiation processes in higher plants. Only four topics were chosen in order to elucidate the actual situation in research. The first was the regulation of differentiation, with a strong emphasis on enzymatic processes. At the present time it can be stated that the synthesis of amino acids, proteins and enzymes is controlled by the main nitrogen sources, nitrate and ammonium. Storage of proteins in seeds and enzyme synthesis during germination appear to be good models for an experimental approach. The second topic of the meeting was the regulation of organelle biosynthesis, with a strong emphasis on chloroplast development although ribosomes and glyoxysomes were also discussed. The third topic was the regulation of differentiation in cell and tissue culture, an actual and red-hot problem. It was, nevertheless, extended to embryogenesis in vitro. The last part of the conference was devoted to the interaction in a broad sense of plant hormones, in regulation. Hormones play not only an essential role as regulators of meristematic activity, but also in cell wall loosening, root growth, flowering and polarity.

The various subjects were treated by the most competent experts. If one is missing some aspects, e.g. regulation of fertilization, fruit development, nuclear division, this must be contributed to the limits of a regional conference.

This conference report, printed in a camera-ready procedure, is completed with the inclusion of the 157 titles of the poster presentations given during the conference, some of which would have been most interesting if they could have been included in these proceedings. For all people who attended the convivial meeting, the printed version of the main lectures will bring back memories of the sprightly discussions held during the official sessions and social events. H.F. Linskens, Nijmegen

Vanderplank, J.E.: Genetic and Molecular Basis of Plant Pathogenesis. Advanced Series in Agricultural Sciences. Vol. 6
Berlin-Heidelberg-New York: Springer 1978. 167 pp., 3 figs., 36 tabs. Hard bound $ 24,–
This is the first book in plant pathology to be conceived within the framework of molecular genetics and biochemistry. The evidence for the new hypothesis of disease resistance is thoroughly discussed. According to this hypothesis in compatible combinations the pathogen enzyme specified by the gene for virulence copolymerizes with complementary host protein. This copolymerization interferes with the autoregulation of the host gene that continues the production of the protein. In incompatible combinations the enzyme specified by the gene for avirulence in the pathogen stays actively catalytic in the host cell. No doubt this hypothesis will stimulate new research on the genetics, biochemistry and cytology of host-parasite interrelations.

The book is arranged in ten chapters: the first characterises variations in the resistance of the host and in pathogenicity of the parasite; Flor's gene-for-gene and Vanderplank's protein-for-protein hypotheses are analysed in chapters two, three, four and five; the sixth chapter examines population genetics of the pathogen; the seventh, eight and ninth deal with horizontal and vertical resistance. The book closes with the new hypothesis on the origin of necrotrophy and biotrophy.

This book is written with pioneer enthusiasm and contains valuable information on various aspects of plant disease resistance and mode of host-parasite recognition. It would prove useful to a wide range of readers: plant pathologists, geneticists, plant biochemists, mycologists, virologists, anyone who is concerned with plant diseases. The great merit of the book is that it puts forward new ideas and reveals new ways for further investigations.
Yulia M. Plotnikova, Moscow

Phillips, R.L., Burnham, R.C.: Cytogenetics.
Stroudsburg, Pennsylvania: Dowden, Hutchingon & Ross. 1977. 489 pp., 120 figs. 37 tabs. Hard bound $ 44,–
The editors of Volume 6 of the Benchmark Papers in Genetics, Drs. R.L. Philips and C.R. Burnham, did an admirable job in selecting and commenting on important papers which have significantly influenced the development of cytogenetics from classical studies up to what may be called 'molecular cytogenetics'. The book is subdivided into 7 parts: I. chromosome individuality, morphology, structure and number, II. Chromosome replication, III. Chromosome pairing, IV. Crossing over, V. Chromosome function, VI. Chromosome behavior, VII. Genetical and cytological mapping. All in all, 49 significant contributions to the field have been included, some (15 from 49) in abridged forms (with the editor's note where material has been omitted). Each of the seven parts begins with a narrative on 'Historical Perspectives' and comments by the editors on the papers included into the section which stress important aspects of each of the papers. In this way the reader is profoundly supplied with additional information that places chapter and papers into the right context. Two of the 49 papers are translations from German, one from French. There is no doubt to the reviewer that the book will meet with much interest, the more so since the development of science, including development of cytogenetics, is so rapid that the normal researcher easily loses or never gets close contact to the milestone papers distributed over a lot of different journals. Most of these are easily accessible here! R. Rieger, Gatersleben

Fraenkel-Conrat, H., Wagner, R.R. (eds.): Comprehensive Virology, Vol. 8: Regulation and Genetics. Bacterial DNA Viruses.
New York-London: Plenum Press 1977. 350 pp., 37 figs., 14 tabs. Hard bound $ 35.40
'Comprehensive Virology', which will comprise some 6000 pages in a total of 22 volumes, represents a commitment by a large group of active investigators to analyze, and expostulate on the great mass of data relating to viruses. Volume 8 deals with the regulation and genetics of DNA bacteriophages.

In chapter 1, D. Rabussay and E.P. Geiduschek describe the regulation of gene action in the development of lytic coliphages, including T7, T3, T5, T4 and the *Bacillus subtilis* phages SP01 and SP82. The chapter is introduced by general remarks on different aspects of transcription and translation control in bacteria. Chapter 2 (R.A. Weissberg, S. Gottesman and M.E. Gottesman) deals with the lysogenic pathway of bacteriophage λ (the live cycle of λ, repression, integration and excision). In chapter 3, A. Campbell summarizes a lot of data concerning defective and incomplete prophages (definition, methods of propagation, genetics of defective variants, naturally defective phages, defective phages and evolution). The last chapter written by R. Calendar, J. Geisselsoder, M.G. Sundshine, E.W. Six and B. Lindqvist is devoted to the P2 – P4 transactivation system (live cycle of P2 and P4, genes of satellite phages, role of helper phages, reciprocal transactivation).

Volume 8 includes about 1400 citations up to 1976, points out new methodical approaches and open questions, making the book valuable for all people interested in the field of molecular biology. S. Klaus, Jena

Boyer, H.W., Nicosia, S. (eds.): Genetic Engineering. Proceedings of the International Symposium on Genetic Engineering. Vol. 2. Amsterdam-New York-Oxford: Elsevier 1978. 310 pp., 88 figs., 28 tabs. Hard bound Dfl 108,–
Recombinant DNA technology offers powerful tools for unravelling the genetic complexities of higher organisms and for the genetic engineering of microorganisms designed to produce useful products for the biomedical sciences and industry. An international symposium in Milan focused on some of the latest and most exciting research in this field. The topics ranged from new plasmid vectors in *E. coli* and *B. subtilis*, analysis of genes in eukaryotes, e.g. the split ovalbumin gene or rRNA genes by molecular cloning, to nitrogen fixation genes and Ti-plasmids in *Agrobacterium*. Additional reports dealt with the view of industry, e.g. how to increase enzyme or antibiotic production by respective approaches. Finally, international cooperation and the problems of possible hazards and corresponding safety regulations in different countries were touched upon. These presentations are compiled in the reviewed volume. The contribution of Szybalski on the dangers in controlling hypothetical risks is especially practical considering the present state of wide-spread public apprehension. The book is well edited, its fast publication (from the manuscripts) guaranties a nearly up-to-date source of information on this explosive field of molecular biology.
W. Klingmüller, Bayreuth

Gunther, F.A., Gunther, J. (eds.): Residue Reviews: Residues of Pesticides and Other Contaminants in the Total Environment, Vol. 69.
Berlin-Heidelberg-New York: Springer 1978. 146 pp., 18 figs., 35 tabs. Hard bound DM 44,–
Parathion, an extensively used organophosphate insecticide in agriculture, is reviewed with special reference to the topic 'Soil-parathion surface interactions' by B. Yaron and S. Saltzman. Practical conclusions concerning the behavior of parathion in the soil environment may be drawn regarding the preferential distribution into the organic matter and clay fraction of the solid phase, the possibility of a build-up of long-lasting residues in the soil and a slow degradation process by the hydrolysis of the phosphate ester bond into nontoxic metabolites retained by the soil colloids.

An extensive review of 'Toxaphene' is given by G.A. Pollock and W.W. Kilgore. Owing to the complex and mostly unknown chemical composition of this organochlorine insecticide (at least 175 different C_{10} polychloro compounds were found in 1974), residue analysis of toxaphene has to be improved by detailed descriptions of sample preparation and GLC peak interpretation. The following topics are reviewed in detail: acute, subacute and chronic toxicity, pharmacological symptoms, in vitro effects, resistance, residue analysis and residues, persistence, accumulation and biomagnification, chemical composition, metabolism and data interpretation. In light of the results of recent studies, an accurate assessment of the environmental and metabolic fate of toxaphene is premature. The third review of Vol. 69 by M.T. Lo and E. Sandi is dealing with residues of polycyclic aromatic hydrocarbons (PAH) in foods. Of the 22 PAH identified in foods, 11 have been found to be carcinogenic in experimental animals. Of the 11 carcinogenic PAH, only very few have been demonstrated to exhibit positive dose-response relationships in chronic studies with mice. Of the 40 identified PAH metabolites, only five have been tested for carcinogenicity in mice and rats, with negative results. Until now there is no evidence to suggest that any of the 11 known carcinogenic PAH or their combinations can cause cancer in human beings via the oral route, especially in quantities likely to be present in foods. In summary, it can be stated that although foods contain about 11 known carcinogenic PAH, there is no proof that at prevailing levels these contribute to the incidence of cancer. The only recommendation one can formulate is that the level of PAH should be kept low in smoked or grilled meats and fish. W. Dedek, Leipzig

Schwemmler, W.: Mechanismen der Zellevolution. Grundriß einer modernen Zelltheorie.
Berlin-New York: de Gruyter 1979. 275 pp., 114 figs., 26 tabs. Soft bound DM 42,–

From the Big Bang to the evolution of civilization ... On the cover of the book it is claimed: 'The book tries, for the first time, to explain systematically and to discuss the evolution of cells (eocells, bacterial cells, higher cells) in connection with the cosmic and chemical evolution. The displayed facts result in the outline of a modern cell theory. Prominent feature of the theory is the development of a periodic system of cells. Analogies between this hypothetical periodic system of cells and the periodic system of elements are discussed'. Does the author keep his promise?

In the first parts of his book he sums up current ideas on the development of the cosmos, the atoms, on the abiotic production of biomolecules, on the definition and characteristics of life and on the evolution of 'precytes'. Generally he follows the ideas of Kuhn and Eigen. However, when he tries to extend these ideas, for instance in developing models to explain asymmetrical 'abiomembranes', it becomes difficult to accept his pattern of thought, first because the figures proper (e.g. Fig. 5.8) and their explanations often are not intelligible; second because at least some data which serve as the basis for his concepts of the system appear to be vague or even incorrect, and third because the deduction does not seem to be logical in several cases. Criticism must be directed particularly to the second part of the book, where the author discusses the evolution of procytes, eucytes and mycetocytes (eukaryotic cells with endosymbionts) and favours an endosymbiotic origin of the eukaryotic cell. A few further examples (only a few from a possible long list) illustrate the negative impression. In Figure 6.2 it is stated that the partial pressure of oxygen is another expression for the osmotic value. On p. 163 the genetic autonomy of the flagella is calculated to be 20%, although on p. 176 it is correctly stated that in recent studies DNA could not be detected in basal bodies and centrioles. It remains unclear why the author relates flagellar proteins to an hypothetical minimum protocyte consisting of 100 different proteins. Does he include the plasmalemma or not? On p. 161 fossils of the gunflint formation, which could be dinoflagellates, are taken as evidence for the assumption that the *flagellated* eukaryotic cells are older than those *with mitochondria*. He neglects the established fact that living dinoflagellates have both flagella and mitochondria and generally also chloroplasts!

The 'physiochemical basic types' (Table 8.1.) of the author have a weak and often incorrect basis. It is not intelligible how and why the comparison of pH, pO (oxygen partial pressure!) and ion content of such different systems as vacuolar sap from mosses, the soluble fraction of pseudomonads and of the flagellar apparatus (how can the pH and pO of the flagellar apparatus be determined?) can be used as the basis for a system. In addition, vacuolar sap, including that from mosses, usually is acidic and not pH ~7, whereas the pH of sieve tubes is slightly basic and not ~6 as given for the phloem.

The 'periodic system of cells' is also crowded with errors. It contains 'Myzelchromozellen' of fungi and chromoplasts in petals functioning as 'Photoerger' (i.e., cells which can, like Halobacterium, transform light into ATP via a proton pump), and lists the cells of brown algae as dinoflagellates and those of red algae as Cryptomonadines. The criticism of the book does not mean that the hypothesis of the endosymbiotic origin of eukaryotic cells is wrong! In his preface the author states that several colleagues who reviewed the manuscript had actively criticized his concepts, and that he had considered not publishing this book. Indeed, it would have been better, had he not done so. E. Schnepf, Heidelberg

Burnet, M.: Endurance of Life. The Implications of Genetics for Human Life.
Cambridge: Cambridge University Press 1978. 230 pp., 7 figs., 2 tabs. Hard bound £ 8,95

During the course of this book it becomes more and more evident that it is almost impossible to arrive at a comprehensive judgement or even to give an outline of its content. The topics raised are extremely divergent and appear often to be only loosely connected. One immediate question which is raised during reading is who is supposed to be the adressant of this book. To any biologically untrained reader it will probably be almost impossible to follow the arguments in the majority of the chapters or even to develop an individual opinion. For biologically educated readers on the other hand the description often arrives at a point which appears almost useless. With this background in mind any judgement on this book must necessarily be subjective as the entire outlay of the book is also subjective.

It represents an interesting, although often astonishing, insight into the ideas and experiences of the author. His view on the biological problems of life in the widest context are highly determined by his career as an immunologist and geneticist. This results in a projection of most of the features of human life onto the background of his genotype, which is seen as the main determinant of life. The genetic constitution leaves, from the view of Sir Macfarlane Burnet, hardly any space for serious environmental influence. This results in particular in a basically pessimistic view on the future of man. It is suspected that our present social attitudes strongly act against selection and will eventually favour the intellectual and physical degeneration of man. Burnet nevertheless clearly refuses any efforts in a direction of 'eugenics' in the conventional sense. His concerns are more dedicated to medical problems resulting from genetic diseases. This is certainly related to his medical experiences and permanent confrontation with individual human pain. Burnet strongly argues in favour of less intense medical effort in cases of the seriously inhibited newborn or patients of advanced age, a postulate which probably has – even if often unspoken – the sympathy of physicians and biologists.

It is surprising that Burnet, in contrast to this humanitarian attitude, states strong arguments in favour of the rejection of criminals, which he considers in the first instance to be genetically programmed, from society.

It is impossible to further summarize the many different aspects of life raised in this book. Many of them are discussed with a view on individual death. Death also is assumed to be genetically determined in time in the individual life except when it occurs by accident or general infections. Aging is completely explained by somatic mutations which result in defective repair and immunoresponse mechanisms.

In my feeling the general acceptance of genetic determination appears somewhat extreme. It is certainly an oversight by the author that inherent to the qualities of a genotype is its flexibility to respond to environmental influences. The rather subjective views of the author are also emphasized by his belief that certain diseases, especially cancer, are solely due to defects in the genome. The action of virus in inducing cancer is simply denied. Such restrictions in discussing open questions fairly apply to many parts of the book.

The most valuable aspect of 'Endurance of life' is, in my opinion, that it rigorously touches taboos which most authors avoid even mentioning. Unfortunately, readers who might be preferentially adressed with such points of view will hardly manage to proceed to those chapters of the book (the last ones) which are of general importance to questions of society. W. Hennig, Nijmegen

Stent, G.S.; Calendar, R. (eds.): Molecular Genetics, An introductory narrative. 2. Ed.
San Francisco: W.H. Freeman and Company 1978. 773 pp., 314 figs., 27 tabs. Soft bound $ 18.70
It was a real pleasure for this referee to read this 'Introductory Narrative'. The knowledge which one is able to acquire from the text seems to me to provide more than the prerequisites necessary in order to pass an examination in molecular genetics. The reader also gets a profound idea of how the knowledge was acquired induced by new ideas, results or methodical efforts. The following sentence, taken from the chapter entitled 'The Map', characterizes how new efforts are linked with preceding discoveries: 'Hereshey and Luria reported their first isolation of r and h phage mutants in 1946, at the 11th Cold Spring Harbor Symposium, at which ... the victory of the one-gene-one-enzyme theory was celebrated, and Lederberg and Tatum announced their discovery of bacterial sexuality. But at that same meeting Delbrück and Hershey presented another finding ... recombination ... in phage ...' The authors have carefully selected the 'milestones' signifying this process and have always tried to be informative while still providing thrilling reading.

In this second edition the text has been revised, extended or otherwise rearranged according to recent discoveries. This is especially true for chapters 8 and 9 which now treat coherently the subject 'DNA Structure and Replication' separately from chapter 18, 'DNA Replication Mechanism'. Nearly all of the 21 chapters have been extended by the insertion of new sections; for example, the chapters on Recombination, Genetic Fine Structure, DNA Transcription and Regulation of Gene Function. The book has grown 650 to 773 pages. A number of figures have been added, some were improved.

Last, not least, I would challenge the reader of this review to find what I was unable to, striking insufficiencies in this 'historiography' of Molecular Genetics. J. Hofemeister, Gatersleben

Austin, C.R., Short, R.V. (eds.): Fortpflanzungsbiologie der Säugetiere. Band 3: Hormone und Fortplanzung.
Berlin: P. Parey 1979. 124 pp., 53 figs., 4 tabs. Soft bound DM 26,–
The third volume of the series 'Reproduction in Mammals (C.R. Austin and R.V. Short, Eds.), which gives an introduction to the role of hormones in reproduction, is now available in German. The 5 chapters, which are written by five different authors, give clearly written surveys of the most important topics of hormone physiology in reproduction. A general introduction to the types of hormones and their modes of action is followed by chapters on the hypothalamus, on cyclic events, on pregnancy and on lactation. Each chapter provides an elaboration of the basic principles as well as information on species-specific mechanisms. Thus, an undue schematism, which often mars introductory works, is avoided. This is especially praiseworthy in a work which tries to remain concise (121 pages). One problem is the degree of coordination between the authors as to the contents of the different chapters. Efforts to achieve to homogenous text are obvious, though could have been more effective. Unfortunately, the index does not mention all essential treatments of a given term (e.g. gestagens, ovulation). Nevertheless, the book, which has been adequately translated into German, gives a clear introduction for undergraduate students. H. Altner, Regensburg

Proceedings of Symposium on Plant Tissue Culture. May 25-30, 1978, Peking.
Peking: Science Press 1978. 531 pp.
It is a bad habit to publish a book of presented papers after each conference when these papers are or will be published normally elsewhere. However, in this instance, although a number of the papers are already published the book is highly welcome as most of the original information is written in Chinese. Unfortunately all references referring to such papers are still in Chinese. Of the 47 papers presented, 80% and all of the 30 one-page abstracts of contributed papers are written by Chinese scientists. Consequently, this book gives a first survey of the results of (most?) Chinese research groups working in plant tissue culture. Hu Han, a co-editor of this journal, introduces part one, anther culture, a field in which China has gained a leading position in the world, predominantly in the development and application of haploids of cereals. This chapter is the most informative and fills a full half of the book's space. In the second part, protoplast culture, speakers from abroad dominate by the weight of the scientific quality of their results; most papers have, however, only a review character. In the third part, vegetative propagation and others, Langridge reports outstanding new results on the construction of vectors out of plasmids and cauliflower mosaic virus for the transfer of foreign DNA into higher plants; a paper which demonstrates that this book contains very recent developments. The Chinese contributions in this chapter are rather heterogeneous. To summarize, this book is of extreme usefulness to those involved in tissue culture and, in particular, in anther culture research. It is further of political interest as it elucidates in English the present situation of one of the important fields of botanical work in China.

G. Wenzel, Köln

Litvak, A.I.: Luminescence Macro- and Microscopy in Fruit Trees and Vine Research. Luminescentnaja makro- i mikroskopija v issledovanijach plodovych kultur i vinograda.
Kishinev: Shtinca 1978. 111 pp., 67 figs. Soft bound Rouble 2,4
Fluorescence microscopy seems to have a fairly large potential application in plant breeding work. There are two groups of substances in plants that can be detected by this method: naturally fluorescing ones and substances, which give fluorescence after staining with more or less specific fluorochrome chemicals. In both cases the fluorescing substance emits visible light when being excited by UV illumination.

The author (from the Viniculture Research Institute in the Moldavian SSR) presents his own results together with those of some others, most of whom are Soviet investigators. These results were obtained by the fluorescence technique having been applied to research on pollen tube growth in vitro and in vivo. He also describes Soviet made equipment for fluorescence microscopy and some methods of staining.

By this simple technique it is possible to obtain spectacular pictures of gametes in the pollen tubes and to check the compatibility of crosses. The pollen tubes fluoresce vividly after being stained with aniline blue and their localization may be minutely inspected on squash preparations of the pollinated pistils shown in the illustrations.

The booklet is aimed to a wide spectrum of readers, therefore some very basic information is also included.

B. Rodkiewicz, Lublin